

Coursera | IBM Applied Data Science Capstone

## **Best Location for Vegetarian Business in Hong Kong**



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## Introduction

Veganism is rapidly growing globally, and Hong Kong is no exception as nearly a quarter of Hong Kong population practised flexitarian (semi-vegetarianism) in 2018<sup>1</sup>. The vegetarian population in Hong Kong grew, from 350k in 2008 to 1.6 million in 2014<sup>2</sup>, at a CAGR of 29%. This is contributed by local millennials' values, social media buzz and food scandals.

Hong Kong residents in 2014, in fact, consumed the highest amount of meat and seafood (at 144kg per capita) in the world<sup>3</sup>. However, the consumption habits in Hong Kong have been changing dramatically. The ratio of “hardcore meat lovers” dropped significantly from 27.1% in 2014 to 17.2% in 2016, and further dropped to 15.2% in 2018<sup>1</sup>. Clearly, Hong Kong people are shifting to a plant-based diet.

With the recent trend stated above, the opening of a vegetarian restaurant is a great business opportunity in Hong Kong. But of course, as with any business decision, opening a new venue requires serious consideration and is a lot more complicated than it seems. Particularly, the location of the vegetarian restaurant is one of the most important decisions that will determine whether the restaurant will be a success or a failure.

## Business Problem

The objective of the project is to analyse and select the best location in the city of Hong Kong to operate a new vegetarian restaurant. For this purpose, data science methodology and machine learning techniques will be executed to figure out a solution. The project targets to answer a very important question: Where would be the best location for a new vegetarian restaurant to be open in Hong Kong?

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<sup>1</sup> Green Monday, 2019 (<https://greenmonday.org/post/greenmonday-2018-survey-result/>)

<sup>2</sup> Statista, 2018 (<https://www.statista.com/statistics/975075/hong-kong-number-of-vegetarians/>)

<sup>3</sup> Euromonitor, 2015 (<https://blog.euromonitor.com/meat-consumption-trends-in-asia-pacific-and-what-they-mean-for-foodservice-strategy/>)

## Target Audience

Provided that 3.7% of the Hong Kong population are vegetarian<sup>1</sup> suggests Hong Kong, which currently has around 14,000 restaurants<sup>4</sup>, should have over 500 vegetarian restaurants to fulfil the demand. Nevertheless, there are less than 300 vegetarian restaurants in Hong Kong<sup>1</sup>, implying there is much room for growth. Hong Kong's plant-based grocery and café chain Green Common, for instance, reported the annual sales turnover of 2018 doubled compared with 2017, and has maintained the same growth over the past 3 years<sup>1</sup>. It reflects the continuous growth of demand for plant-based foods in Hong Kong. Also, shopping malls should increase the proportion of vegetarian restaurants to meet the demand of flexitarians.

With the uprising of veganism in Hong Kong, the vegetarian market should be targeted. So, here the project is. As with any retail business, the location is critical for vegetarian restaurants to access more potential customers, develop customer loyalty and especially generate the profits. The target audience then will be very clear – people who share the values or who eager to profit from the trend:

- **Restaurant Owners:** The entrepreneurs who plan to open a new vegetarian business could have a better starting point with an ideal location, while the current restaurant owners could serve the vegetarian options if its location suggests it;
- **Shopping Mall Management** could higher the proportion of vegetarian restaurants if it is located in the recommended area;
- **Restaurant Investors** could make a more comprehensive investment decision with a better understanding of the project;
- **Vegetarian Citizens** or people who value “GREEN” could identify the eco-friendly areas to go, to stay or to live.

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<sup>4</sup> FEHD HKSAR ([https://www.fehd.gov.hk/english/statistics/pleasant\\_environment/statistienh\\_2015\\_2018.html](https://www.fehd.gov.hk/english/statistics/pleasant_environment/statistienh_2015_2018.html))

## Data

The following data will be required to solve the problem:

- List of Hong Kong's districts. This defines the scope of the project, which is confined to the city of Hong Kong, a Special Administrative Region of the People's Republic of China.
- Latitude and longitude coordinates of those neighbourhoods. The data will be used to plot the map and to get the venue data.
- Venue data, particularly data related to vegetarian / vegan restaurants. The data will be used to perform clustering on the neighbourhoods.

Sources of data and methods to extract them:

- Wikipedia: "Districts of Hong Kong"<sup>5</sup> includes a list of all districts of Hong Kong, with a total of 18 political areas. The techniques of web scraping will be applied to getting the required data from the Wikipedia page, facilitated by the use of Python requests and BeautifulSoup packages. Besides, a CSV file containing the geographical coordinates of the districts will be prepared in GitHub for the purpose of data mapping.
- Foursquare API: Venue data will be extracted from Foursquare location data, which has the dataset of over 62 million venues across over 190 countries with over 900 venue categories<sup>6</sup>. The venue category "Vegetarian / Vegan Restaurant" will play a key role in the execution of data analysis, and further the solution of the business problem.

The project will make use of many data science skills, from web scraping (Wikipedia), interacting with API (Foursquare), data cleaning, data wrangling, to machine learning (K-means clustering) and map visualization (Folium).

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<sup>5</sup> Wikipedia: Districts of Hong Kong ([https://en.wikipedia.org/wiki/Districts\\_of\\_Hong\\_Kong](https://en.wikipedia.org/wiki/Districts_of_Hong_Kong))

<sup>6</sup> Foursquare, data extracted on February 2020 (<https://enterprise.foursquare.com/products/places>)